Circulatory shock

MANAGING MIXED SHOCK STATES

There are four main classes of shock

- Hypovolemic
- Distributive
- Cardiogenic
- Obstructive

Many cases of shock may involve more than one of these elements.

Causes

Sepsis

Sepsis may cause a distributive shock through release of endotoxin or inflammatory cytokines, but there is often concomitant dehydration and hypovolemia from insensible losses, fever, and / or gastrointestinal losses. In severe cases, myocardial dysfunction may be present leading to a cardiogenic component as well.

Anaphylaxis

Anaphylaxis, by definition, involves more than one organ system. This may result in a vasodilatory (distributive) shock, as well as cardiogenic shock. Hypoxemia may result from bronchial constriction, exacerbating the scenario, or causing vasoconstriction, thus adding an element of vascular obstruction. Gastrointestinal losses may be present as well, leading to hypovolemia.

Traumatic injuries

Traumatic injuries may cause a variety of mechanisms for shock. Hypovolemia from bleeding, distributive shock from neurologic injury, cardiogenic shock from direct cardiac trauma, and obstructive shock from tension physiology, may cause a complicated clinical picture. It is worthwhile to note that hypocalcemia resulting from large volumes of blood transfusions (containing citrate) is an exacerbating factor that is often easily overlooked.

Adrenal insufficiency may cause decreased vascular tone, electrolyte abnormalities, cardiac dysfunction, and volume loss.

Neurogenic shock, for example from a spinal cord injury, may interrupt vascular tone, causing hypovolemia. Above the mid-thoracic vertebrae, this may also interrupt sympathetic ganglia, disrupting the heart's ability to compensate with a higher heart rate, causing a relative cardiogenic shock.

Treatment

Treatment for mixed shock states should focus on reversing any underlying causes. This may mean antibiotics and source control for sepsis, surgery for traumatic injuries, etc. A rational approach to directly addressing the derangement in physiology will often guide the clinician in the appropriate direction. For example, a rapid point-of-care ultrasound evaluation of the heart may help distinguish a cardiogenic etiology for which vasopressors or volume resuscitation alone may not be adequate.